SYSTEMATIC
MANAGEMENT
SERVICES, INC

20201 Century Boulevard
Germantown MD 20874
(301) 353-0072
(301) 353-0076/FAX

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Fraser R Lockhart Director
Environmental Restoration Division
Department of Energy
Rocky Flats Office
Golden CO 80402-0928

Re Review of Baseline Risk Assessment and Environmental Evaluation Sections of

(1) October 1991 Preliminary Draft phase I RFI/RI Work Plan for OU10 (other outside closures) at Rocky Flats Plant (3 volumes)

(2) June 1991 Final Phase II RFI/RI Work Plan (Bedrock) 903 Pad Mound and East Trenches Operable Unit No 2) Rocky Flats Plant

Dear Fraser

I received the subject documents within your October 16th package to me upon my return from RFP on October 28 Since the items listed above have a deadline of today I am providing my comments to you following only a day's review of the two I have also not been able to reach HAZWRAP staff to discuss their comments Evidently they are in meetings today the phones have not been answered at either Randy Harris or Tom Brennan s office

Both Documents

1 The methodology to be used for risk assessment (actually human risk assessment) and for environmental evaluation (actually population and community evaluation) is much less developed than the balance of the Work Plans There is an implied or explicit promise [see page 8-13 of the OU 10 work plan] that the exposure scenarios will be developed assumptions stated and data use specified at some future point and submitted to EPA for review and approval I have the following concerns

A work plan is being submitted which will support the development of a health risk assessment and environmental evaluation under baseline [that is pre-remedial actions] conditions but we do not define in other than the most generic of ways the following

data needs including parameters for measurement, frequency
data quality objectives
the level(s) of resolution analyses will be performed
specific methods to be used for assessment
levels of risk [impacts] to be resolved/predicted

Controlling The Future''

What is the relationship between those data specified in field sampling/analysis of contaminants with health risk assessment and environmental evaluation?

What is the relationship between the work plans and the ongoing efforts in risk assessment/modeling?

2 Based on the current knowledge of the ecosystems at RFP [at least representative of RFP aquatic and terrestrial systems based on the myriad of studies evaluating ecosystem community and population dynamics by CSU and others] it seems we could in the work plan be able to clearly establish the following

What are the most probable [e g > 75%] target species exposure scenarios?

What media of contaminant accumulation are likely? What are the likely biomagnification routes? What nutrient cycling processes are likely to be affected?

What are the expected complexity stability and diversity parameter values of representative ecosystems? How do these differ from estimates made under current conditions?

3 Based on current epidemiological data for the area [both occupational exposures for DOE plants and RFP specifically and the public in the communities of Boulder Golden Denver]

What are the most probable [e g > 95%] human exposure scenarios?

What are the most probable off-site exposure scenarios?

What are the ambiant levels of illnesses in the geographic region?

What are the ambiant incidence of death which could be caused by principal contaminants of RFP in the geographic region?

Recommendation

It would seem to me that it would be very appropriate to develop a set of SOPs for risk assessment and for environmental evaluation for all OUs on at RFP The SOPs

could then address many of the issues which are discussed below and the OU work plans could cite these and specify their application in the specific OU study

I believe it is critical that we very rapidly define methodologies to be used and levels of detail (order of magnitude qualitative quantitative) which can be used as the basis for specific work plans Within each of these levels it is possible to identify a variety of assessment tools including models that may be used depending on the data requirements purpose of the assessment etc

If such an approach were taken the risk assessments and environmental evaluations which will need to be completed for proposed remedial actions during construction operations and following closure or during long-term monitoring for both NEPA and CERCLA purposes will be much easier to complete and more consistent with the baselines prepared during this phase

Referenced Document 1 Section 8, Baseline Risk Assessment

1 The material presented in Volume 1 pages 5-4 through 5-6 is totally duplicative of that presented in Volume 2 pages 81 8-2 and 8-5 It seems appropriate that this material be in Volume I and that a more detailed discussion focusing on the implementation of the general methods sanctioned by EPA be placed in Volume II

2 The risk assessment overview (p 8-1 Volume II) states that the baseline risk assessment will serve as justification for doing remedial actions It would seem more appropriate to discuss the role of the baseline human health risk assessment presented in Section 8 and its role in determining need for remedial actions when coupled with (1) ARARs (2) effluent and emission Limits and (3) environmental (ecological) risk assessment

The last sentance of paragraph one cites the EPA guidance for potential human health impacts "as part of" this baseline risk assessment — we fail to clearly define any other parts and it is not apparent to the reader that there are any

3 Section 8 1 page 8-1 bullet #3 — why are we defining environmental receptors here since the rest of Section 8 deals with human exposure/risk? Is this meant to be referring to exposure to media such as soil resuspended dust having inhalation risk water as ingestion risk or to food stuffs e g plants/animals who have had significant uptake and retention of contaminants?

If so please clarify If this refers to ecological risks I'd recommend we delay its discussion to Section 9 where it is treated more fully

4 Section 8 1 page 8-2 first full paragraph -- redundant with paragraph one of the section We could state the objectives specifically for the baseline human health risk assessment in this space

5 Section 8 2 page 8-2 first sentence -- the objectives stated are extremely vague It will be difficult to gather "all OU10 data relevant." The objectives should specifically identify those data collection and data evaluation tasks required to satisfy the risk assessment to be produced

6 Section 8 2 page 8-1 paragraph -- It is stated that data were collected more is being collected and all will meet QA criteria However it is not obvious what is now known that provides the basis for additional data collection as well as its justification to cause expenditures It would be helpful before beginning this section to assess what the data available contribute to the risk assessment what is missing what has to be done to fill the data gaps and how essential these data are for risk assessment purposes

7 Table 8-1 Reference to EPA 600-3/89/013 seems out of place in the human health assessment section as does EPA/540/1-89/001A While there is an interface with the environmental evaluation it seems these citations are directly applicable to Section ° Conversely why are there no citations to general human health risk assessment methodologies -- reliance on the EPA guidance is problematic since they are dated and the agency assumes that the risk assessment staff routinely are aware of new developments in the field and the wider knowledge basis than what provides their "benchmark" guidance

8 Section 8 2 pages 8-6 and 8-7 -- many of the items listed could have and possibly should have been done prior to the development of the work plan to quantify parameters needed for risk assessment Assuming that a section such as that recommended in comment 6 above is created the information here could be cast as the second tier needed to get from order of magnitude risk evaluation to at least quantitative and for some COC quantitative risks

9 Section 8 3 -- it would seem appropriate to state what is known what hypotheses have been developed and the process that will be followed

specifically to test these with respect to exposure the current section reads as a generic treatment of the process with no information furnished as to the work being planned specifically for OU10

10 Section 8 4 -- it seems still too generic to be a work plan for a specific OU The use of human toxicology data and testing data from in vitro and in vivo animal models should be distinguished and the reliance of the risk assessment on the two stated

11 Section 8 5 — How is synergistic risk assessed? Do you envision one characterization per COC? If so how do you integrate for total risk?

12 Section 8 6 does not define the work plan to be implemented from the standpoint of uncertainty The following as a minimum should be addressed

what sources of uncertainty are recognized

how do the uncertainties ramify through the assessment process (in other words are they additive multiplicative do we have a basis to know)

there are uncertainty estimates for epidemiological data for toxicity data for extrapolation of animal model test data to humans etc

Referenced Document 1 Section 9, Environmental Evaluation Work Plan

1 General to Section 9 0 RFP/RFO staff has had many discussions about ecosystems and use of a "systems approach to conducting environmental evaluations especially in the risk assessment committee In the first paragraph it is apparent that an attempt has been made to include this approach in the evaluation methodology However the paragraph demonstrates that the concept is not understood and the balance of the section excludes any but biotic impacts with the exception of an analytical approach to evaluation of trophic structure

It seems appropriate that one of two directions is taken immediately Either the approach used is (1) system [which means that one or more indicators of effects are evaluated at all levels of ecological complexity including systems community population leaving organism level and biochemical level impacts in the domain of toxicology and reflected only in ramifications into

trophic structure changes or as analogs to human health risks] or (2) biotic [which means that analysis is made of toxicological and population impacts of target species which are T&E/protected key from a trophic perspective or are economically or recreationally important]

The argument for use of a systems approach is that it provides a mechanism to determine stress and recovery of aquatic and terrestrial ecosystems in response to chemical contamination Since systems parameters represent measurements of the highest order interactions within the system [in this case ecosystem] they are sensitive to synergistic stresses and indicative of biological effects that will be manifested at higher contamination rates or after increasing exposure lengths Parameters to monitor include those measuring nutrient cycling system elasticity/resilience, and complexity Of these nutrient cycling parameters are the best documented understood and most cost effective to use

RFO/RFP must make the decision which approach to follow My concern is that the DOE [actually its predecessor agency AEC] made a large investment in the development of ecosystem theory especially in ORNL's Environmental Sciences Division The investment is reflected in much of the ecological literature which used the cycling of radionuclides as the basis for construction of much of the theory the analytical and mathematical models and the field verifications of them under chemical and other stresses (e g clearcutting tree girdling) Within the DOE programs it would be appropriate to (1) use all the theory and data collection/analysis techniques developed applicable to risk assessment and environmental evaluation and (2) not present information which erroneously applies the developed work

If a systems approach is used [and I would strongly recommend doing so] then I strongly recommend the basis for its use be founded in work done by O'Neill (ORNL) Shugart (now at VPI) Waide and Webster and a cast of others primarily based in Oak Ridge U GA and CSU I have enclosed a copy of a 1983 paper I published in Environmental Monitoring and Assessment primarily for the bibliography

2 Section 9 1 Paragraph 1 The phrase quantifying the ecological effects to the biotic environment does not make sense to the reader The proposal to address all ecosystem components is an invitation to failure as well as excessive expenditures for our purpose I suspect that the intent was to

address indicators of the structural complexity of the systems but even that represents a large body of work that is difficult to justify to support for risk assessment and environmental evaluation purposes--- for one thing it is difficult to show what you d do with all the data if they were collected

If a systems approach is desired I would recommend that the following parameters be used and the relationship to risk assessment/environmental evaluation techniques be carefully defined before field work is begun

ecosystem	nutrient cycling as indicated by export rates of essential elements along a gradient from highly contaminated to background COC levels within a system (a subwatershed not a vegetation type or habitat)
community	trophic analyses as briefly indicated in Section 9 2 parameters which can be used include analysis of redundancy in each trophic level [so that food availability may be less affected if one food species for higher level populations is affected] identification of "kingpin" species [those which if adversely affected cause significant changes in higher order populations be out migration of those species declines due to lack of food or changes in food species taken]
	diversity especially of plant species
population	dynamics [e g reproduction rate numbers or biomass]
	toxicological response including biouptake and bioaccumulation

I would highly recommend no attempt be made to evaluate microbial communities except as they are reflected in nutrient cycling measures

3 Section 9 1 page 9-3 second paragraph — this will be the outcome only if a systems approach is followed I concur if the desired outcome and it provides the linkage to human risk assessment as well

4 The balance of the work plan seems adequate to evaluate biotic effects within the impacted systems The use of trophic analysis is not defined at the level allowing review It seems the use as presented is only to identify target species for tissue analysis and ecotoxicological evaluations

Referenced Document 2 Section 5 6, Baseline Risk Assessment

1 The level of detail is inconsistent with that prepared for OU10

2 The organization of health risk and environmental evaluation as components of a single baseline risk assessment is preferable in the opinion of the reader to their use as separate analyses as was done in OU10

3 Since the subject is bedrock would it be preferable to describe how the data being collected for this phase is (1) integrated into the OU database and (2) contributes to filling the data needs for the OU baseline risk assessment? It would seem reasonable to prepare no more than one integrated baseline risk assessment including public health risk and environmental risk for the OU and to include in this work plan only the relevant data needs, parameters to be measured etc

4 The environmental evaluation (Section 5 6 2 page 5-9 & 10) is clearer than that presented in OU 10 only because it makes no attempt to incorporate the systems approach to the analysis Comments from the OU10 work plan above (all of comment 1 and the last of comment 2 describing parameters for measurement) apply to this discussion as well

5 If the general comment recommending the development of SOPs for the risk assessment (including health and environmental) were adopted, the work plan discussion would be the brevity of the current discussion [which is helpful] and be specific to the work to be completed to support the assessments by its implementation

October 29 1991 (BSA Comments)
Review of Baseline Risk Assessments (OU10 OU2)

If I can be assistance in revising these risk assessment sections please let the staff know of my willingness and availability If a system approach is to be adopted I would willingly assist development of the SOPs etc since ecosystems analysis is my specialty and emains a keen interest especially as it applies to remediation and D&D projects

Thanks for the opportunity to review and comment on these work plans

Sincerely

Beverly S Ausmus PhD1